

THAT WHICH IS CLAIMED:

1. A composite support for a semipermeable membrane, said support comprising
  - a spunbond nonwoven fabric first layer formed of continuous thermoplastic polymer filaments defining a first outer surface of the support; and
  - 5 a wet-laid nonwoven fabric second layer formed of discrete length thermoplastic polymer fibers defining a second outer surface of the support.
2. The composite support of claim 1, including a thermoplastic polymer binder bonding said first and second layers to one another.
- 10 3. The composite support of claim 2, wherein said thermoplastic polymer binder is in fibrous form.
4. The composite support of claim 2, wherein the continuous filaments of said first layer and the discrete length fibers of said second layer are formed of the same thermoplastic polymer, and said thermoplastic polymer binder is adhered to the filaments  
15 of said first layer and to the fibers of said second layer.
5. The composite support of claim 1, wherein said continuous thermoplastic polymer filaments are formed from polyester, polyamide or copolymers thereof.
6. The composite support of claim 1, wherein said discrete length thermoplastic polymer fibers are formed from polyester or polyamide.
- 20 7. The composite support of claim 1, wherein the continuous filaments of said first layer and the discrete length fibers of said second layer are formed from polyester.
8. The composite support of claim 7, wherein said thermoplastic polymer binder comprises a polyester copolymer having a lower melting temperature than the  
25 polyester polymer of said filaments and fibers.

9. The composite support of claim 1, wherein the fibers of said wet-laid nonwoven fabric have a length of from about 2.5 to 40 mm and are from about 0.2 to 3.0 denier per filament.

10. The composite support of claim 1, wherein the filaments of said spnbond 5 layer are from about 1 to 10 denier per filament.

11. The composite support of claim 1, wherein said spnbond nonwoven has a basis weight of about 10 to 35 gsm and said wet-laid nonwoven has a basis weight of about 30 to 70 gsm.

12. The composite support of claim 1, wherein said composite support has an 10 overall basis weight of up to 80 gsm.

13. A filtration device comprising a semipermeable membrane or porous polymer layer adhered to said second outer surface the composite support of claim 1.

14. A filtration device according to claim 13, wherein said semipermeable membrane comprises at least one polymer selected from the group consisting of cellulose acetate, cellulose triacetate, cellulose acetate-cellulose triacetate blends, gelatin, polyamine, polyimide, poly(ether imide), aromatic polyamide, polybenzimidazole, polybenzimidazolone, polyacrylonitrile, polyacrylonitrile-poly(vinyl chloride) copolymer, polysulfone, polyethersulfone, poly(dimethylphenylene oxide), poly(vinylidene fluoride), polyelectrolyte complexes, polyolefin, poly(methyl 20 methacrylate) and copolymers thereof.

15. A filtration device according to claim 13 wherein a porous polymer layer is adhered to said second outer surface, and a semipermeable membrane is adhered to said porous polymer layer.

16. A filtration device according to claim 13, wherein said porous polymer 25 layer comprises polysulfone.

17. A composite support for a semipermeable membrane, said support comprising

a spunbond nonwoven fabric first layer of continuous polyester polymer filaments defining a first outer surface of the support;

5 a wet-laid nonwoven fabric second layer of discrete length polyester polymer fibers defining a second outer surface of the support; and

polyester polymer binder present in said first and second layers and serving to bond said first and second layers to one another to form a unitary integral composite.

18. The composite support of claim 17, wherein said binder in said first layer comprises binder filaments and said binder in said second layer comprises binder fibers and said polyester polymer binder comprises a polyester composition having a lower melting temperature than the polyester polymer of said fibers and filaments.

19. The composite support of claim 18, wherein said spunbond nonwoven fabric first layer is formed of matrix filaments of a polyester homopolymer and binder filaments of a lower-melting polyester copolymer, and said wet-laid nonwoven fabric second layer is formed of matrix fibers of a polyester homopolymer and binder fibers of a lower-melting polyester copolymer, and wherein the first and second layers are bonded to one another under heat and pressure whereby the binder filaments and binder fibers soften and fuse to adhere the layers together to form a unitary integral composite.

20. The composite support of claim 17, wherein the second outer surface of the support is a smooth calendered surface.

21. Filtration media comprising

(a) a composite support for a semipermeable membrane, said support comprising

25 (i) a spunbond nonwoven fabric first layer of continuous polyester polymer filaments defining a first outer surface of the support;

(ii) a wet-laid nonwoven fabric second layer of discrete length polyester polymer fibers positioned in opposing face-to-face relation with said first layer and defining a second outer surface of the support; and

5 (iii) polyester binder bonding said first and second layers to one another to form a unitary integral composite and

(b) a semipermeable membrane or porous polymer layer adhered to said second outer surface of said composite support.

22. The filtration media of claim 21, wherein said polyester binder comprises  
10 a polyester copolymer which is present at the interface between said first and second layers.

23. The filtration media of claim 22, wherein the polyester copolymer binder is also present throughout said spunbond first layer.

24. The filtration media of claim 21, wherein said semipermeable membrane comprises at least one polymer selected from the group consisting of cellulose acetate, cellulose triacetate, cellulose acetate-cellulose triacetate blends, gelatin, polyamine, polyimide, poly(ether imide), aromatic polyamide, polybenzimidazole, polybenzimidazolone, polyacrylonitrile, polyacrylonitrile-poly(vinyl chloride) copolymer, polysulfone, polyethersulfone, poly(dimethylphenylene oxide),  
20 poly(vinylidene fluoride), polyelectrolyte complexes, polyolefin, poly(methyl methacrylate) and copolymers thereof.

25. The filtration media of claim 21, wherein a porous polymer layer is adhered to said second outer surface of said composite support and a semipermeable membrane is adhered to said porous polymer layer.

26. The filtration media of claim 25, wherein said porous polymer layer comprises polysulfone.

27. A method of producing a composite support for a semipermeable membrane, comprising

forming a spunbond nonwoven fabric first layer of continuous thermoplastic polymer filaments;

forming a wet-laid nonwoven fabric second layer of discrete length thermoplastic polymer fibers; and

bonding said first and second layers in opposing face-to-face relationship to form a composite support, whereby the first and second layers define first and second outer surfaces of the composite support.

28. A method of producing a composite support according to claim 27, wherein said bonding further comprises transporting the composite support through a nip between a pair of cooperating calender rolls.

29. A method of producing a composite support according to claim 27, wherein the calender rolls are at a temperature between about 120 °C and 230 °C and the nip exerts pressures ranging from about 80 to 200 pli.

30. A method of producing a composite support according to claim 28, wherein said bonding further comprises transporting the composite support through a second nip between a second pair of cooperating calender rolls.

31. A method of producing a composite support according to claim 30, where the second nip is at a temperature between about 180°C to 320°C and the second nip exerts pressures ranging from about 150 to 260 psi.

32. A method of providing a composite support according to claim 30, wherein said second nip exerts a higher pressure than said first nip.

33. A method of providing a composite support according to claim 30, wherein the gap within the second nip is narrower than the gap within the first nip.

34. A method of producing a composite support for a semipermeable membrane, comprising

forming a nonwoven fabric first layer by extruding a multiplicity of continuous thermoplastic polymer filaments, randomly depositing the filaments on a collection surface, and bonding the filaments together to form a spunbond nonwoven web;

5 forming a nonwoven fabric second layer by wet-laying discrete length thermoplastic polymer fibers to form a web and bonding the fibers together to form a wet-laid nonwoven web;

arranging the first and second layers in an opposing face-to-face relationship and  
10 directing the layers through a series of heated nips to bond the first and second layers to one another.

35. A method of producing filtration media, comprising

15 forming a spunbond nonwoven fabric first layer of continuous thermoplastic polymer filaments;

forming a wet-laid nonwoven fabric second layer of discrete length thermoplastic polymer fibers;

bonding said first and second layers in opposing face-to-face relationship to form a composite support, whereby the first and second layers define respective first and  
20 second outer surfaces of the composite support; and

applying a semipermeable membrane or porous polymer layer to the second outer surface of the composite support.

36. A method of producing filtration media according to claim 35, wherein  
25 said applying step comprises at least one process selected from the group consisting of dip coating, extrusion coating, knife-over-roll coating and slot coating.